

Amendment under 37 CFR 1.111
Kozo SHIMIZU et al.

U.S. Patent Application S.N. 09731,726
Attorney Docket No. 001616

REMARKS

Claims 1-6 are pending. New claims 15 and 16 have been added herein.

Support for the newly added claims may be found in the specification on page 12, last paragraph.

Restriction to one of groups I, II or III is required (Office action paragraphs 1-7).

Applicants affirm the election of Group I, claims 1-6, without traverse.

Claims 1-6 are rejected under 35 U.S.C. 103(a) as unpatentable over PL 115725 (Kozlowski et al.), JP 20000118 [sic] (Matsumoto et al.), or Arai et al. (1999 article), or Ogashiwa et al. (U.S. Pat. No. 6,160,224) in view of JP 409260427 (Akamatsu et al.) (Office action paragraphs 10-11).

Applicants respectfully note that Matsumoto et al. is properly designated JP2000015476, rather than JP20000118.

The Examiner states that PL115725, JP 20000118 [sic], Arai et al. and Ogashiwa et al. disclose the invention except for the "alpha ray in Sn." The Examiner states that JP 409260427 discloses "alpha ray could be reduced from a solder bump in the same field of endeavor or the analogous metallurgical art."

The rejection of claims 1-6 is respectfully traversed.

First of all, Applicants respectfully disagree with the Examiner that Arai et al. and Ogashiwa

et al. disclose the invention except for the "alpha ray in Sn". Applicants assert that none of the references discloses the compositional limitations on Ag and Sn recited in claims 1 and 4.

In the case of Koslowski et al., Matsumoto et al., and Arai et al., the limitations of claims 1 and 4 are narrower than the broad ranges disclosed. In Koslowski et al., for example, the composition contains 0.1 to 20% Ag, Au or Pt, and 75 to 99.7% Sn. In Masumoto et al., the alloy contains 95 to 99.4% Sn and 0.5 to 3.5% Ag. In Arai et al., a Sn-Ag-Cu alloy is disclosed, with Ag at 2 to 9% and Cu at 2 to 11%. None of these is a disclosure of the recited ranges.

With regard to Ogashiwa et al., the recited limitations of claims 1 and 4 fall within the disclosed broad ranges of the reference only when Ag is selected rather than In, and when the Pb, disclosed as 0-70%, is limited to less than about 8% (if the Ni/Fe content is 0.02%). Moreover, none of Ogashiwa's examples is consistent with the compositional limitations of the claims. For example, none of Ogashiwa's examples shows the limitation of 1.5 to 2.8 wt% Ag.

Therefore, the references do not teach the compositional limitations of claims 1 and 4, and Applicants further argue that the broad compositional disclosures in the references do not suggest the ranges recited in the claims.

As the Examiner has noted, Kozlowski et al. (PL 115725), Matsumoto et al. (JP2000015476), Arai et al. (1999 article), and Ogashiwa et al. (U.S. Pat. No. 6,160,224) do not disclose the limitation of claims 1 and 4 regarding the amount of α -rays in Sn. Applicants respectfully disagree with the Examiner that Akamatsu (JP'427) suggests this limitation of the claims.

Applicants note that the abstract of Akamatsu appears to suggest only using an alloy of Sn and an element of atomic number smaller than 81 and "not related with alpha decay", which

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Applicants interpret to mean "not capable of undergoing alpha decay." The only example given in the abstract is Sn and Bi. There is no disclosure in the abstract of using Ag, and no compositional limitations are disclosed. The Akamatsu et al. Abstract does not specifically disclose use of Sn with reduced α -ray emission. In addition, no quantitative alpha ray emission limitations appear in the provided abstract of the reference.

Applicants understanding of Akamatsu's (JP'427) Table 1 is that some Sn-Ag based are disclosed, but none of the examples in this table is consistent in composition with the limitations on Ag (1.8 to 2.8 wt%) and Sn (90 wt% or more) recited in claims 1 and 4.

Most significantly, most of the entries in Table 1 of JP'427 list a value of alpha emission of " $<0.1 \text{ cph/cm}^2$ ", while claims 1 and 4 recite a limitation of $0.01 \text{ (cph/cm}^2)$ or less. The limitation in the claims is therefore narrower than the values disclosed in the reference by an order of magnitude. Applicants are unaware of any suggestion in the reference for the value recited in claims 1 and 4.

Applicants therefore believe that there is no suggestion in any of the references for the specific limitation of the claims, and that no *prima facie* case of obviousness can be made using these references. Applicants assert that claims 1-6 are novel and non-obvious over PL 115725 (Kozlowski et al.), JP2000015476 (Matsumoto et al.), Arai et al. (1999 article), Ogashiwa et al. (U.S. Pat. No. 6,160,224) and JP 409260427 (Akamatsu et al.), taken separately or in combination.

If, for any reason, it is felt that this application is not now in condition for allowance, the Examiner is requested to contact Applicants undersigned Agent at the telephone number indicated below to arrange for an interview to expedite the disposition of this case.

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In the event that this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. Please charge any fees for such an extension of time and any other fees which may be due with respect to this paper, to Deposit Account No. 01-2340.

Respectfully Submitted,

ARMSTRONG, WESTERMAN & HATTORI, LLP



Daniel A. Geselowitz, Ph.D.
Agent for Applicants
Reg. No. 42,573

DAG/plb
Atty. Docket No. **001616**
Suite 1000, 1725 K Street, N.W.
Washington, D.C. 20006
(202) 659-2930



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